

8.10 CECIL COUNTY

This chapter presents information about stream conditions of potential management interest in Cecil County based on the 2000-2004 Maryland Biological Stream Survey (MBSS) results. Information from MBSS data collected between 1994 and 1997 can be found in MDNR 2001h.

8.10.1 Ecological Health

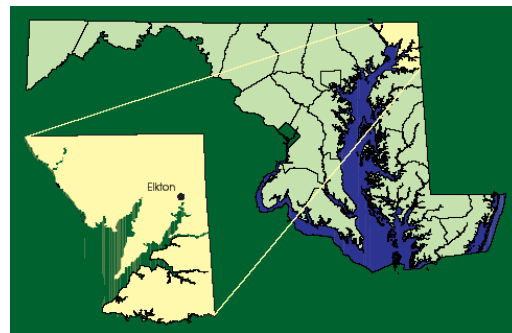
Based on the three ecological health indicators used by the MBSS, the overall condition of Cecil County streams during 2000-2004 was Fair (Figure 8-69). The FIBI results indicate that 40% of the streams in the county were in Good condition, while 32% rated Good using the BIBI. In contrast, 24% of the streams in the county scored as Poor or Very Poor using the CBI, while 29% scored as Good and 47% scored as Fair. No strong geographic patterns in IBI scores were evident, although there appeared to be fewer high IBI sites in the southern part of the county.

The highest rated streams in Cecil County using the Combined Biotic Index (CBI) were Gramies Run and Principio Creek. In contrast, the lowest rated streams included an unnamed tributary to Big Elk Creek and two unnamed tributaries to the Susquehanna River (Table 8-19). Based on Stream Waders volunteer data, the watershed in the county that had the largest proportion of sites rated as Poor or Very Poor for benthic macroinvertebrates was the Sassafras River (Table 8-20). The watershed with the largest number of sites rated as Good was the Northeast River.

TRASH VS CBI

Trash, or human refuse, is common along roadways and streams in Maryland's urban and urbanizing areas. In Cecil County, there was a moderately strong negative relationship between the amount of trash at a site and its Combined Biotic Index score. Potential reasons for this relationship include illegal dumping and runoff of pollutants from associated impervious areas.

One MBSS Sentinel site is located in Cecil County, an unnamed tributary to Principio Creek. Sentinel sites were chosen to provide a representation of the best remaining streams around the state and track natural variations in stream health. Where possible, Sentinel sites are located in watersheds with as much protected land as possible, or in areas projected to become degraded from development at a slower pace. More information about the MBSS Sentinel stream network is found in: 2000-2004 Maryland Biological Stream Survey Volume 11: Sentinel Sites (http://www/dnr/Maryland.gov/streams/pubs/ea05-8_sentinel.pdf).



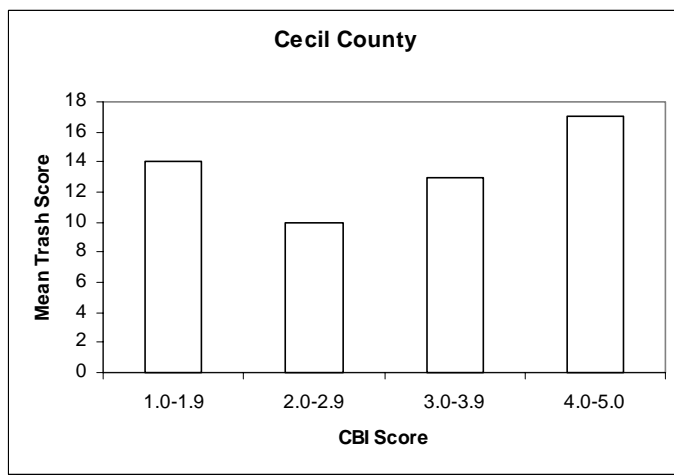
8.10.2 Physical Habitat

8.10.2.1 Overall Condition

Based on the Physical Habitat Index (PHI), only 5% of the streams in Cecil County had Minimally Degraded habitat, 35% had Partially Degraded habitat, and 57% had Degraded or Severely Degraded physical habitat (Figure 8-70). The only sites in the county that were rated as Minimally Degraded were tributaries to the Susquehanna River; no other geographic trends were apparent.

8.10.2.2 Trash

Nearly 49% of the stream miles in Cecil County were rated Optimal for trash (Figure 8-71). In contrast, 15% were rated as being in Marginal or Poor condition. Sites with high levels of trash were concentrated in the northeastern part of the county, and streams around the Elkton area also tended to have elevated amounts of trash.



Cecil County Trash vs. CBI score bar graph

8.10.2.3 Channelization

About 14% of the stream miles in Cecil County had some degree of channelization (Table 8-4). Rip-rap (9%), was

the most common type of channelization, followed by piped culverts and concrete channels. There was no strong geographic pattern in the distribution of channelized sites (Figure 8-72).

8.10.2.4 Inadequate Riparian Buffer

Over 11% of the stream miles in Cecil County had no riparian buffers during the 2000-2004 MBSS (Table 8-3). In addition, 5% of stream miles had severe breaks in existing riparian buffers. The few areas in the county with inadequate riparian buffer were located in the northern part of the county, and severe buffer breaks were also noted in several tributaries to the Susquehanna River (Figure 8-73). Additional information about buffer breaks, analyzed by county, is provided in: 2000-2004 Maryland Biological Stream Survey Volume 10: Riparian Zone Conditions (http://www/dnr/Maryland.gov/streams/pubs/ea05-7_riparian.pdf).

8.10.2.5 Eroded Banks/Bedload Movement

About 42% of the stream miles in Cecil County were rated as having minimal (Optimal) bank erosion (Figure 8-74). In contrast, 30% of streams had eroded banks rated as Poor or Marginal. Areas with erosion problems were mostly located in the northern part of the county.

About 15% of the stream miles in Cecil County were rated as having extensive bar formation (Figure 8-74). An additional 37% of streams had moderate bar formation, and the remaining 48% had little or no bar formation.

AN IMPORTANT NOTE ON BIODIVERSITY MANAGEMENT

Perhaps the largest ongoing natural resources restoration and protection effort in Maryland is associated with the Chesapeake Bay. In most cases, freshwater biodiversity is not specifically considered during placement and prioritization of Bay restoration and protection projects. In this report and in the more detailed volume in the series on aquatic biodiversity, a system of biodiversity ranking is presented to provide counties and other stewards with a means to plan appropriate protection and restoration activities in locations where they would most benefit stream and river species. Given the historically low level of funding for biodiversity protection and restoration in Maryland and elsewhere, the potential benefit of incorporating freshwater biodiversity needs into other efforts is quite large.

However, it is important to note that although freshwater taxa are the most imperiled group of organisms in Maryland, other groups and individual species not typically found in freshwater habitats are also at high risk and constitute high priority targets for conservation. In addition, freshwater taxa that prefer habitats such as small wetlands may not be well-characterized by the ranking system employed here. To conserve the full array of Maryland's flora and fauna, it is clearly necessary to use other, landscape-based tools and consider factors such as maintaining or reconnecting terrestrial travel corridors.

Areas with extensive bar formation tended to occur at sites in the northern portion of the county that also had bank erosion problems.

8.10.3 Key Nutrients

8.10.3.1 Nitrate-Nitrogen

An estimated 23% of the stream miles in Cecil County had nitrate-nitrogen levels within the range found in mostly forested (>90%) streams in Maryland (Figure 8-75). The remaining 77% of stream miles all had elevated levels, but none were above the 5 mg/l threshold beyond which biological effects have been documented. Areas with low levels of nitrate-nitrogen were concentrated in the Northeast River and Big Elk Creek watersheds; all other areas of the county had consistently elevated levels of nitrate-nitrogen.

8.10.3.2 Total Phosphorus

About 27% of the stream miles in Cecil County had total phosphorus levels within the range of values observed in mostly forested Maryland streams (Figure 8-76). Of the remaining miles, nearly 36% had levels above the threshold associated with biological effects. High levels of total phosphorus were found in the northern portion of the county as well as in the three sites located in the southernmost part of the county.

8.10.4 Stream and River Biodiversity

To provide a means to prioritize stream systems for biodiversity protection and restoration within each county and on a statewide basis, a tiered watershed and stream reach prioritization method was developed. Special emphasis was placed on state-listed species, stronghold watersheds for state-listed species, and stream reaches with one or more state-listed aquatic fauna. Fauna considered included stream salamanders, freshwater fishes, and freshwater mussels. Rare, pollution-sensitive benthic macroinvertebrates collected during the 1994-2004 MBSS were also used to identify the suite of watersheds necessary to conserve the full array of known stream and river biota in Maryland. A complete description of the biodiversity ranking process is found in: 2000-2004 Maryland Biological Stream Survey Volume 9: Stream and Riverine Biodiversity (http://www/dnr/Maryland.gov/streams/pubs/ea05-6_biodiv.pdf).

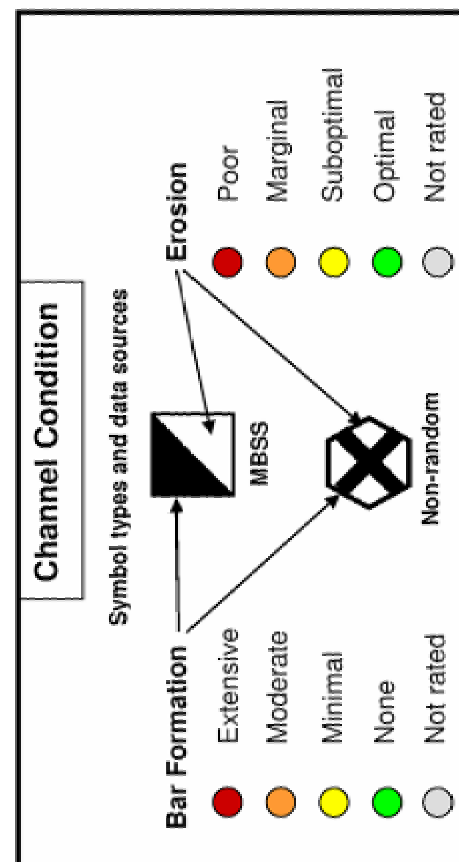
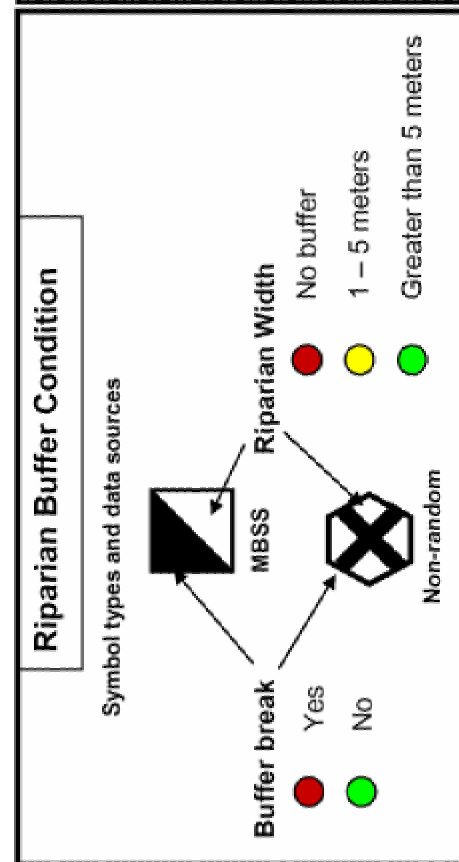
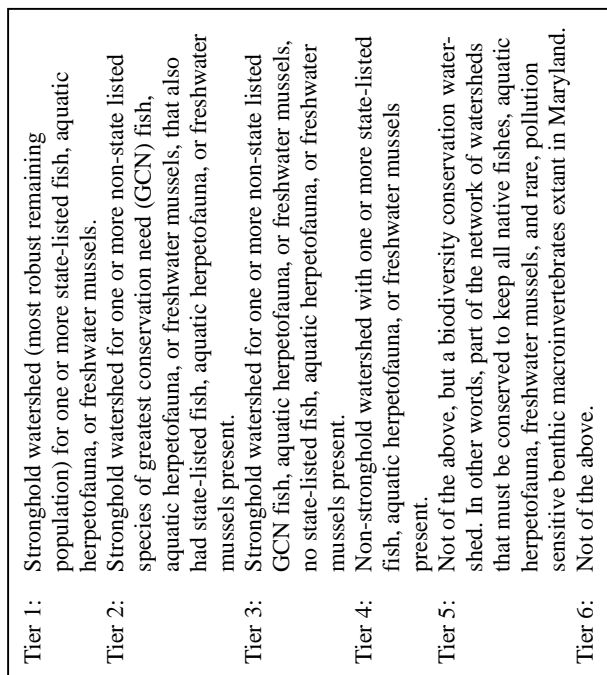
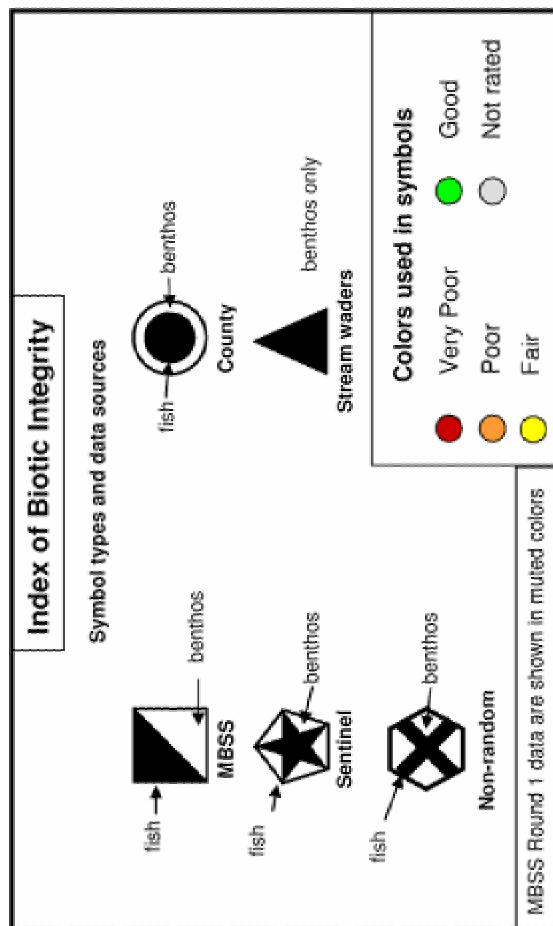
Of the four watersheds found in Cecil County, the highest rated for stream and river biodiversity

was Lower Susquehanna River/Octoraro Creek/Conowingo Dam Susquehanna River, a Tier 2 watershed that was a stronghold watershed for one or more non-state-listed species of Greatest Conservation Need (GCN), and also has one or more state-listed aquatic species (Figure 8-77). The other Tier 2 watershed in the county was Northeast River/Furnace Bay. In contrast, the Lower Elk River/Bohemia River/Upper Elk River/Back Creek/Little Elk Creek/Big Elk Creek/Christina River watershed was the lowest ranking for stream and river biodiversity in the county, and ranked 56th of 84 in Maryland. Any reaches that had either state-listed species or high intactness values were highlighted to facilitate additional emphasis in planning restoration and protection activities.

8.10.5 Stressors

At 100% of stream miles, the most extensive stressor characterized by the MBSS in Cecil County during the 2000-2004 MBSS was non-native terrestrial plants in the riparian zone (Figure 8-5). Other stressors found were: streams with non-native aquatic fauna (present in 66% of stream miles); eroded banks (29% of stream miles); streams with urban land use > 5% (21% of stream miles); acid deposition (observed in 15% of stream miles); and streams with no riparian buffer (11% of stream miles). Low dissolved oxygen (5%) and channelized streams (3% of stream miles) were also among the documented stressors in the county.

Key to MBSS 2000-2004 County Maps



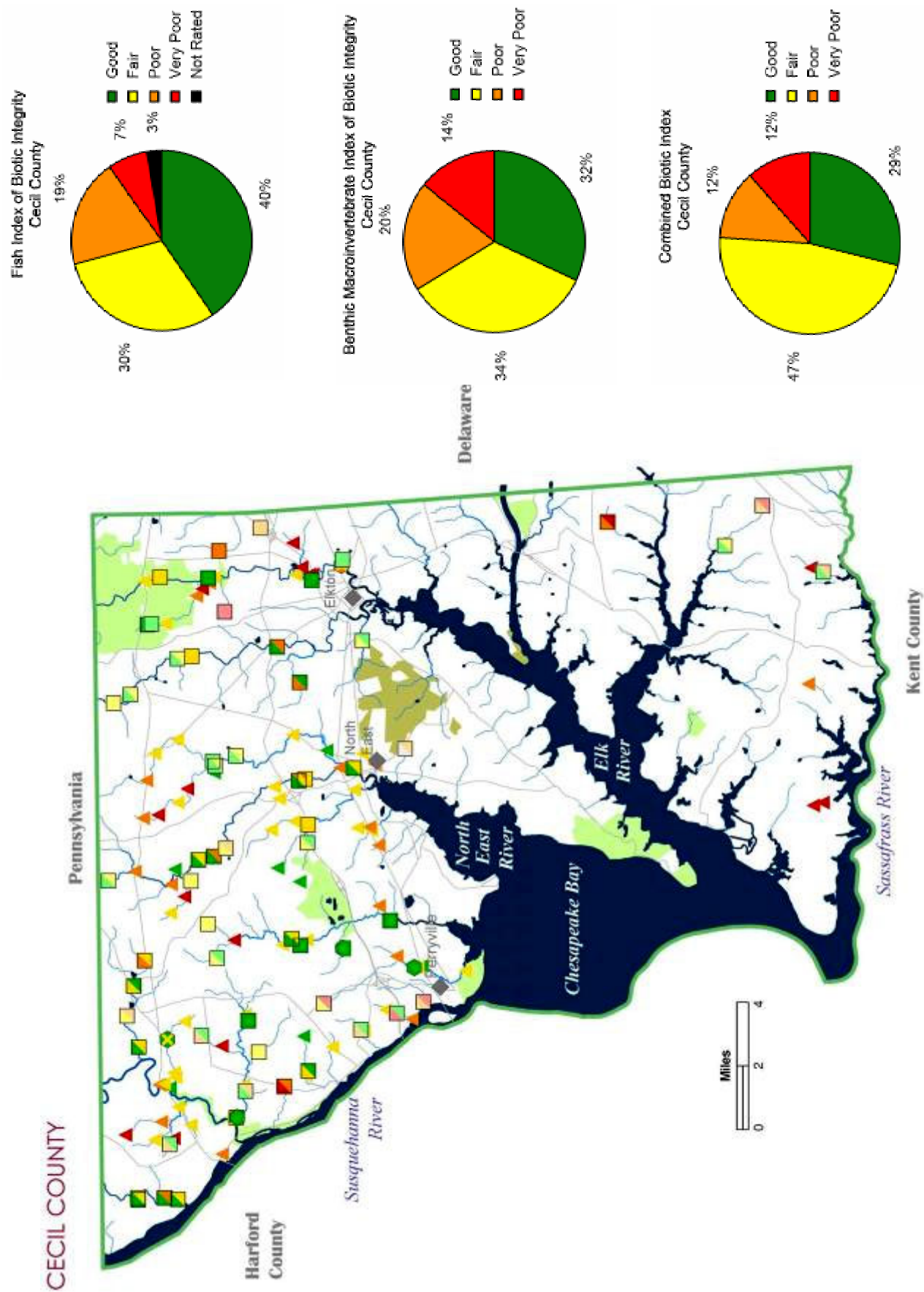


Figure 8-69. Benthic Index of Biotic Integrity (BIBI) and Fish Index of Biotic Integrity (FIBI) pie charts and map of stream health for Cecil County streams sampled by the MBSS during 1995-97 and 2000-2004 (pie charts represent 2000-2004 data only, Combined Biotic Index pie chart represents mean of FIBI and BIBI)

Table 8-20. Stream Waders sites sampled in Cecil County during 2000-2004, ranked by the Family-level Benthic Index of Biotic Integrity

Cecil County - Stream Wader Sites				
WATERSHED	# GOOD	# FAIR	# POOR	# VERY POOR
Big Elk Creek	0	4	4	5
Furnace Bay	1	2	1	1
Susquehanna River Lower	2	6	5	0
Northeast River	5	13	8	3
Octoraro Creek	1	11	2	3
Sassafras River	0	0	1	4

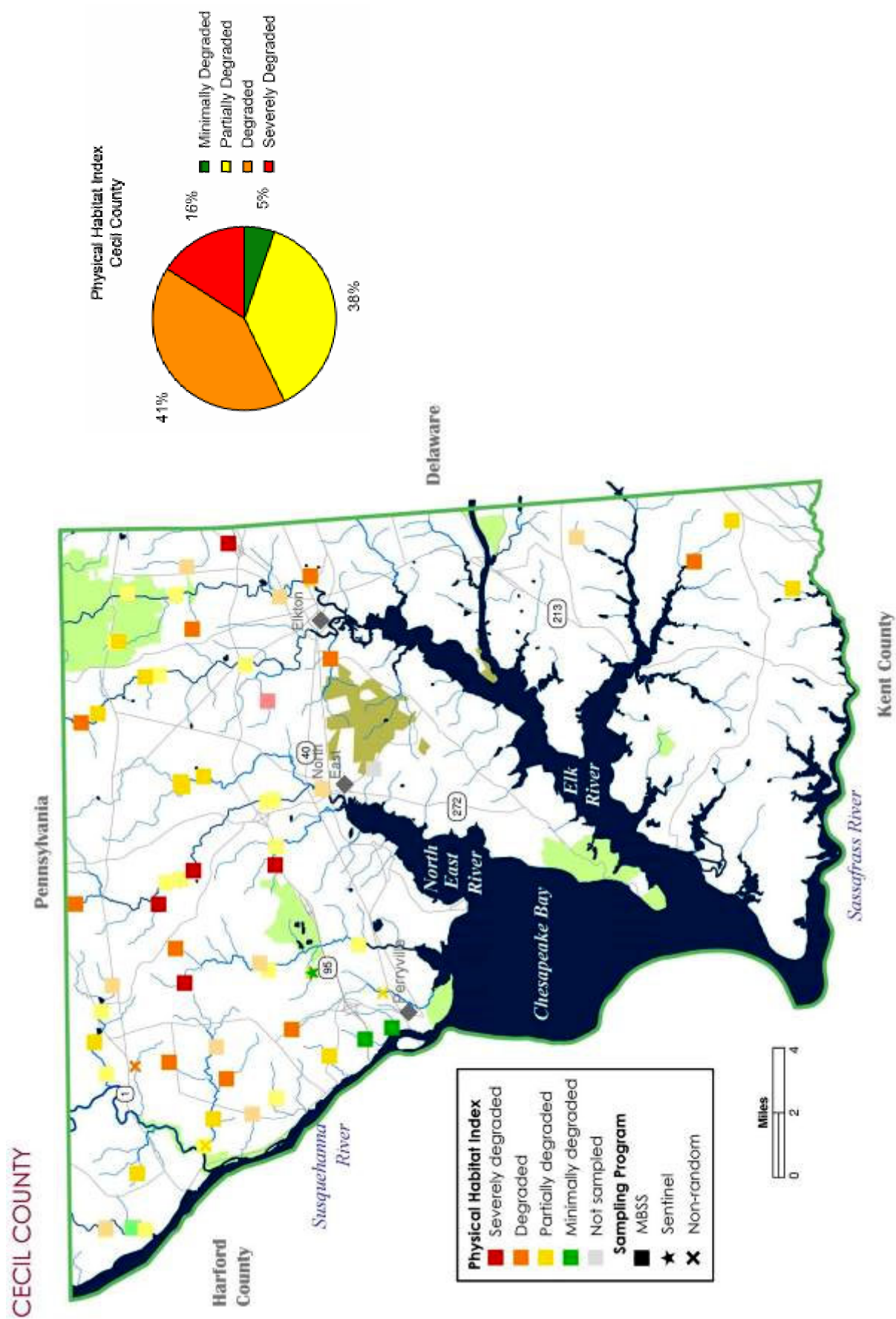


Figure 8-70. Physical Habitat Index (PHI) pie chart and map of stream habitat quality for Cecil County streams sampled by the MBSS during 1995-97 and 2000-2004 (pie chart represents 2000-2004 data only)

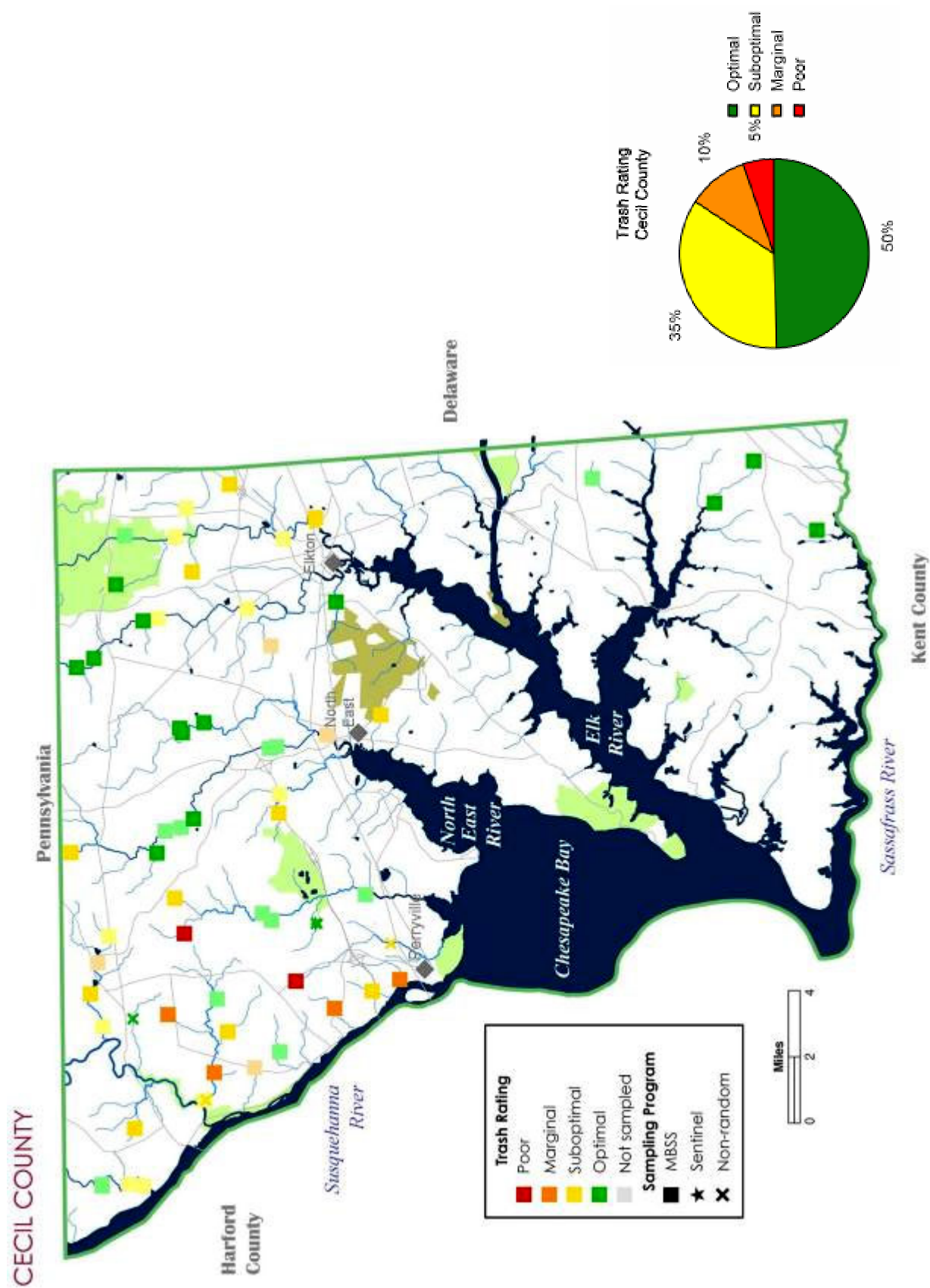


Figure 8-71. Pie chart and map of trash rating (0-20 scale) for Cecil County streams sampled by the MBSS during 1995-97 and 2000-2004 (pie chart represents 2000-2004 data only)

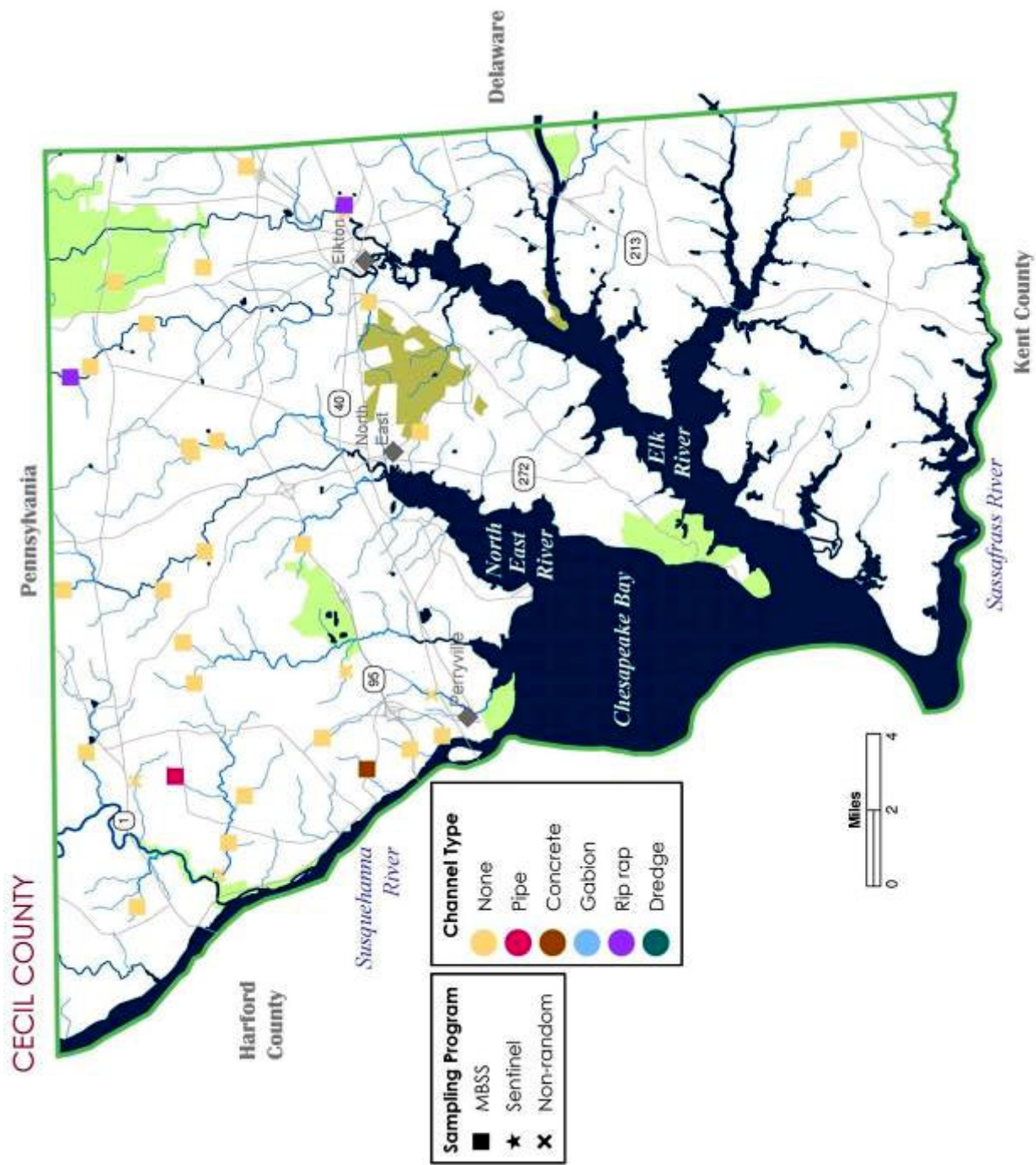


Figure 8-72. Map of channelized sites, by type, for Cecil County streams sampled by the MBSS during 2000-2004. *NOTE: When channelization is indicated, it does not necessarily mean that the entire 75m segment was affected.*

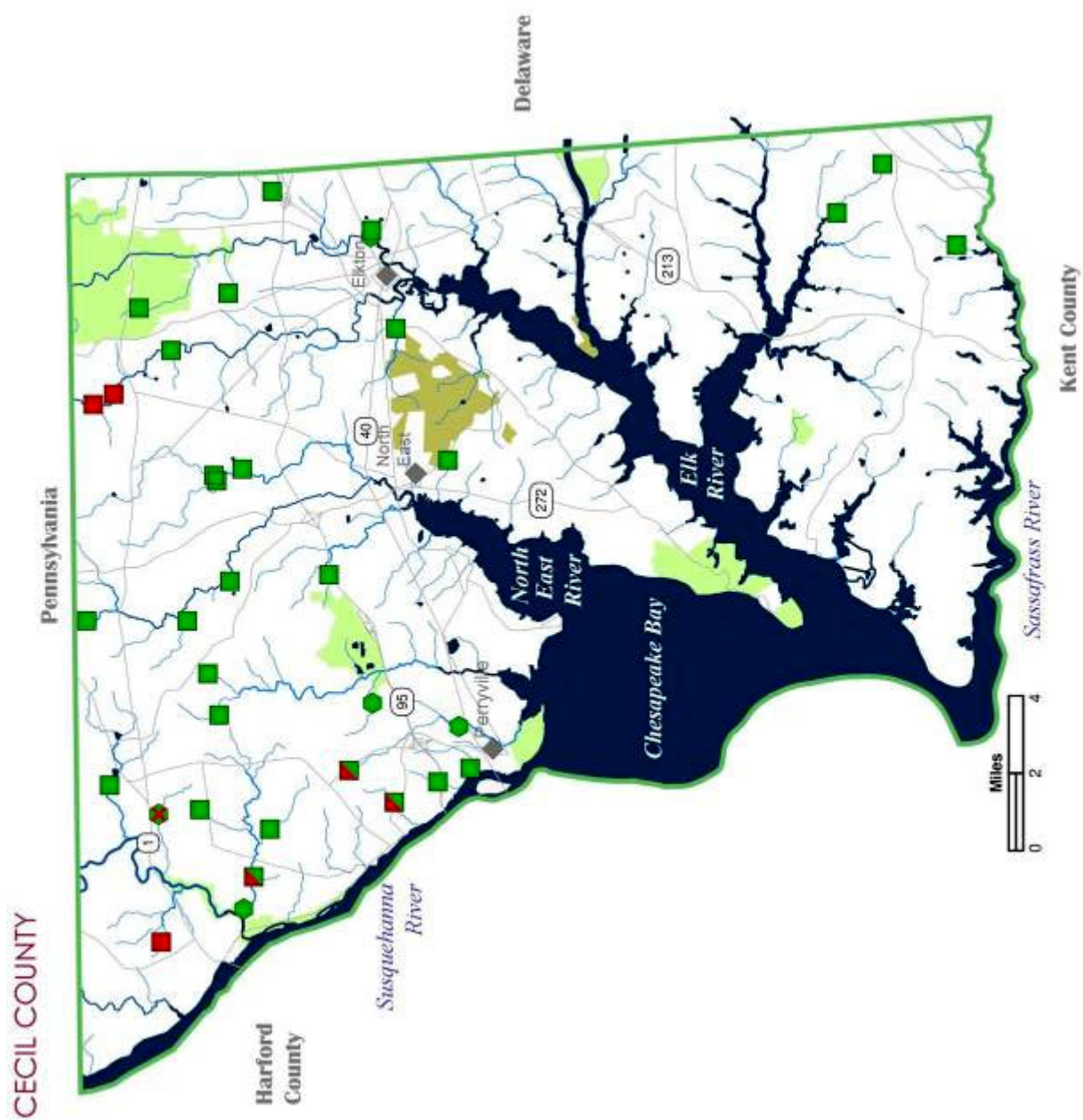


Figure 8-73. Map of sites with inadequate riparian buffers and buffer breaks for Cecil County streams sampled by the MBSS during 2000-2004. *NOTE: Multiple riparian buffer breaks sometimes occurred at a site; only the most severe was depicted.*

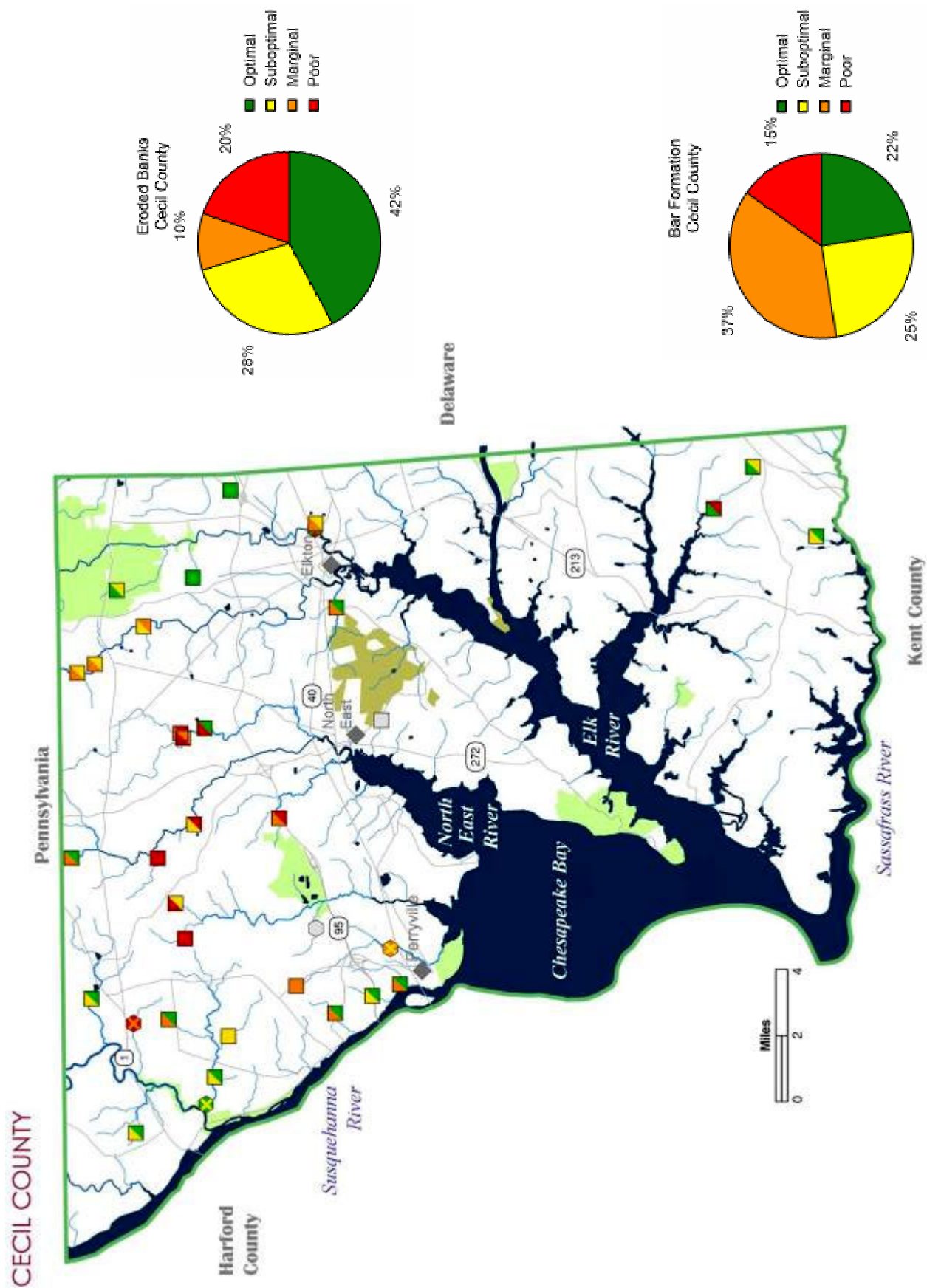


Figure 8-74. Pie charts and map of sites with eroded banks and instream bar formation for Cecil County streams sampled by the MBSS during 2000-2004

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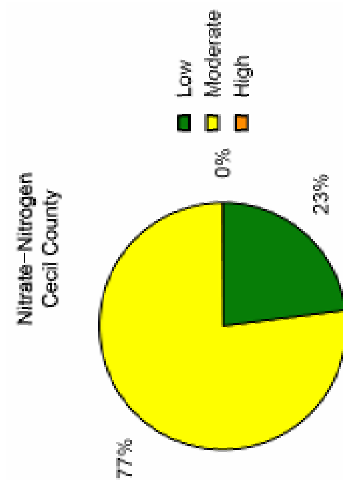
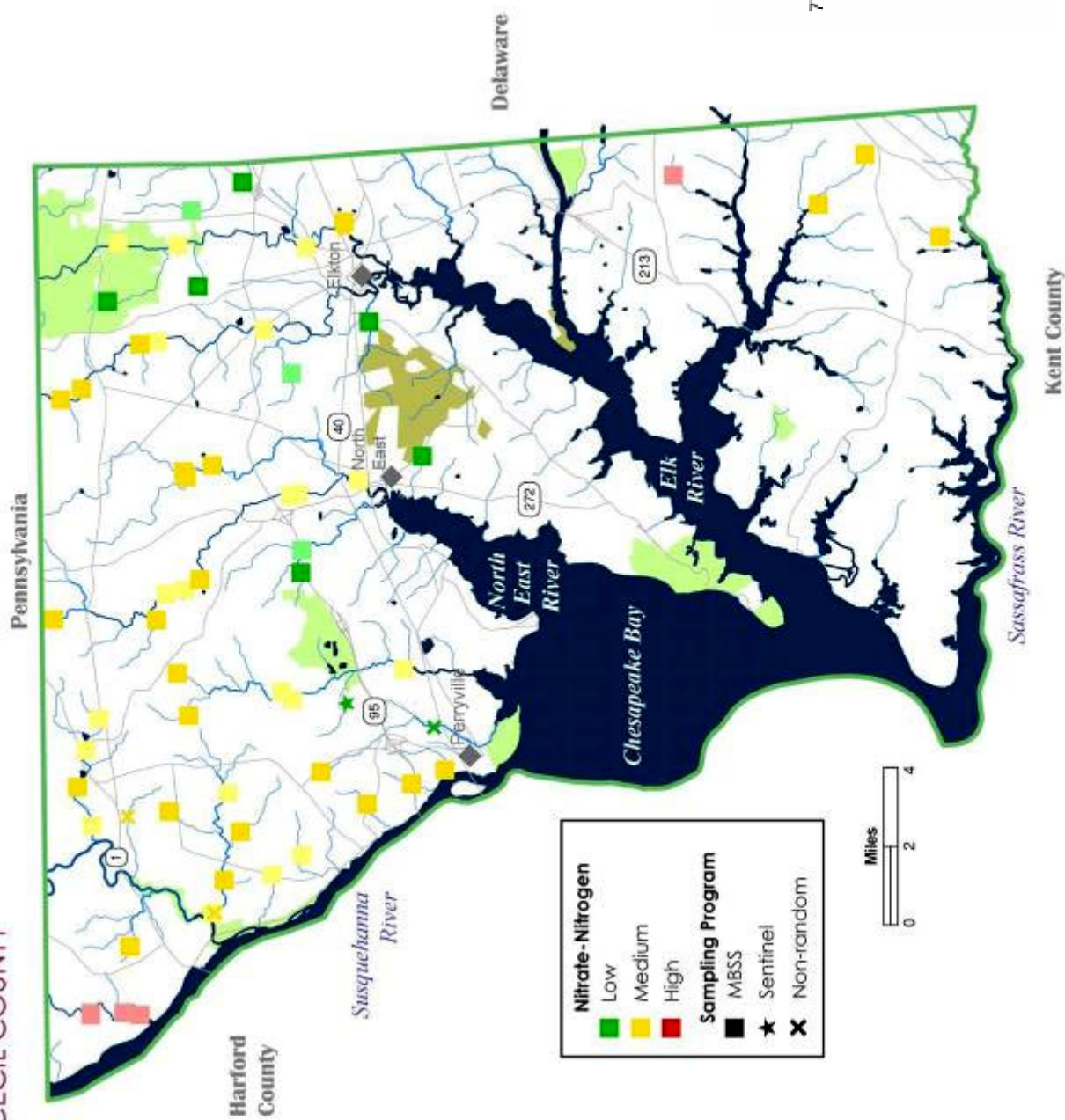


Figure 8-75. Pie chart and map of nitrate-nitrogen values (mg/l) for Cecil County streams sampled by the MBSS during 1995-97 and 2000-2004 (pie chart represents 2000-2004 data only) (Low = 1.0, Medium = 1.0 – 5.0, High = > 5.0)

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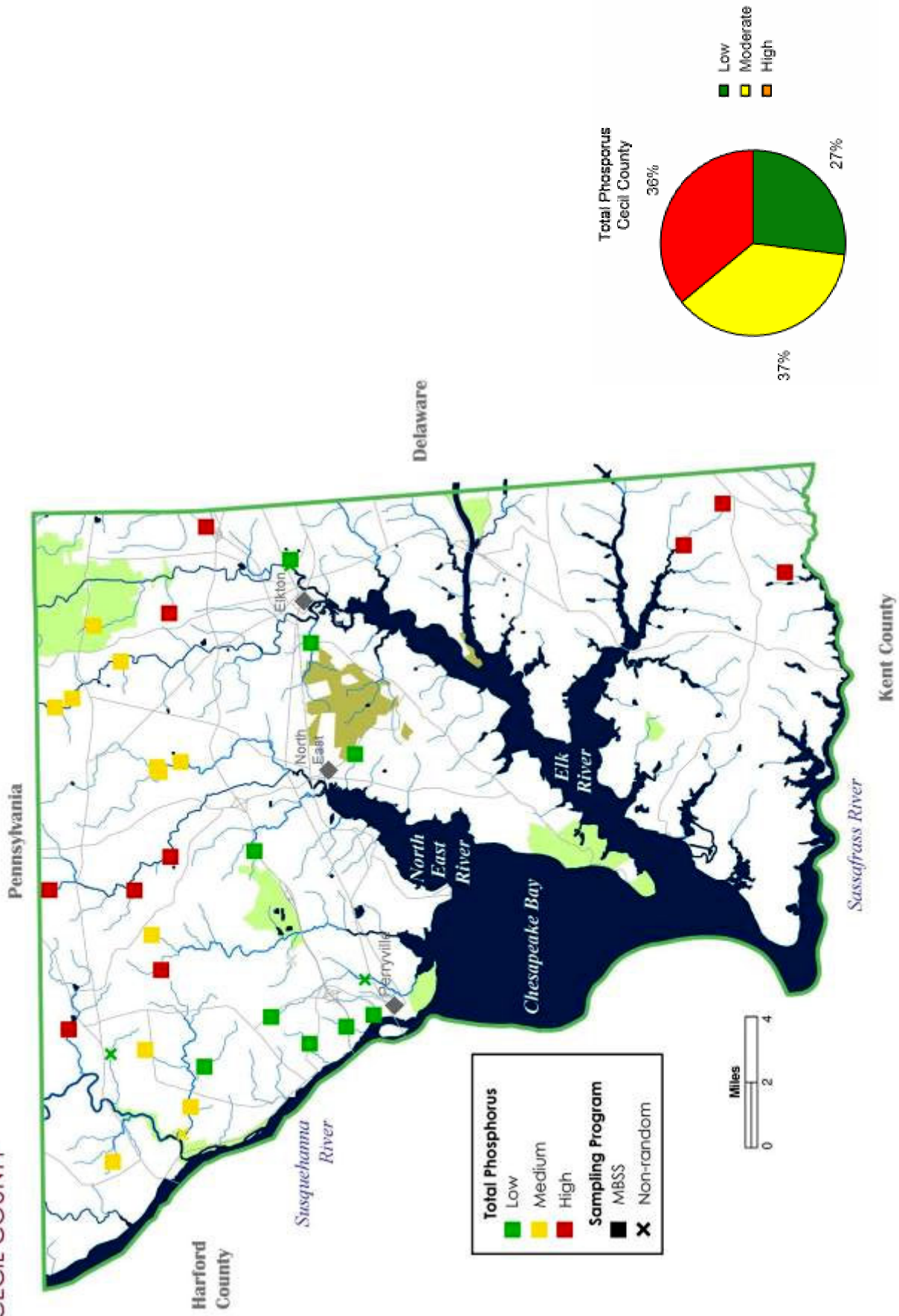


Figure 8-76. Pie chart and map of total phosphorus values (mg/l) for Cecil County streams sampled by the MBSS during 2000-2004 (Low = < 0.025, Medium = 0.025--0.07, High = > 0.07)

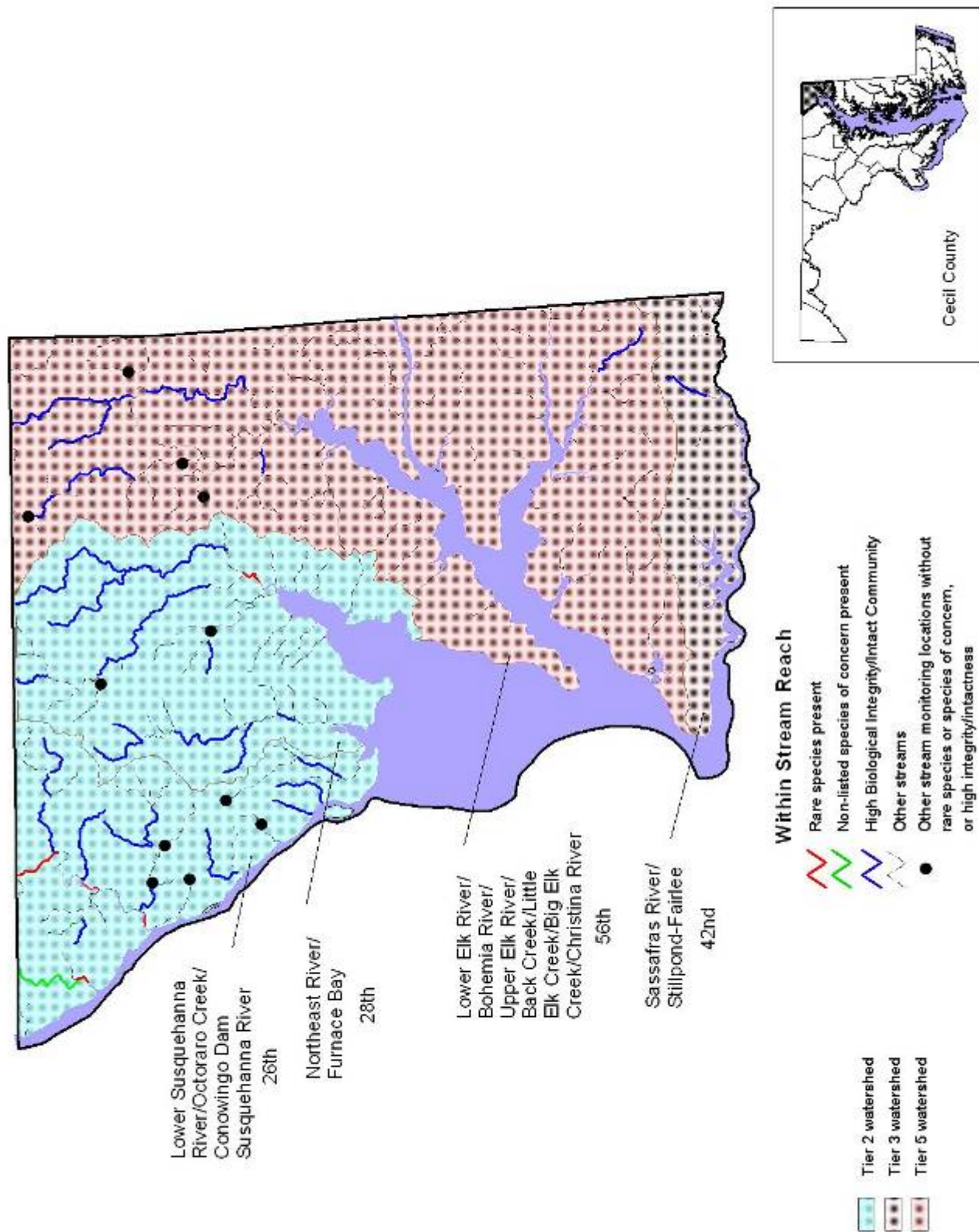


Figure 8-77. Aquatic Heritage Biodiversity Ranking map for Cecil County, by watershed. Data from MBSS 1994-2004, MBSS qualitative data, Raesly, unpub. data, Harris 1975, Thompson 1984, and DNR Natural Heritage Program database.

